California GARDEN

JANUARY-FEBRUARY
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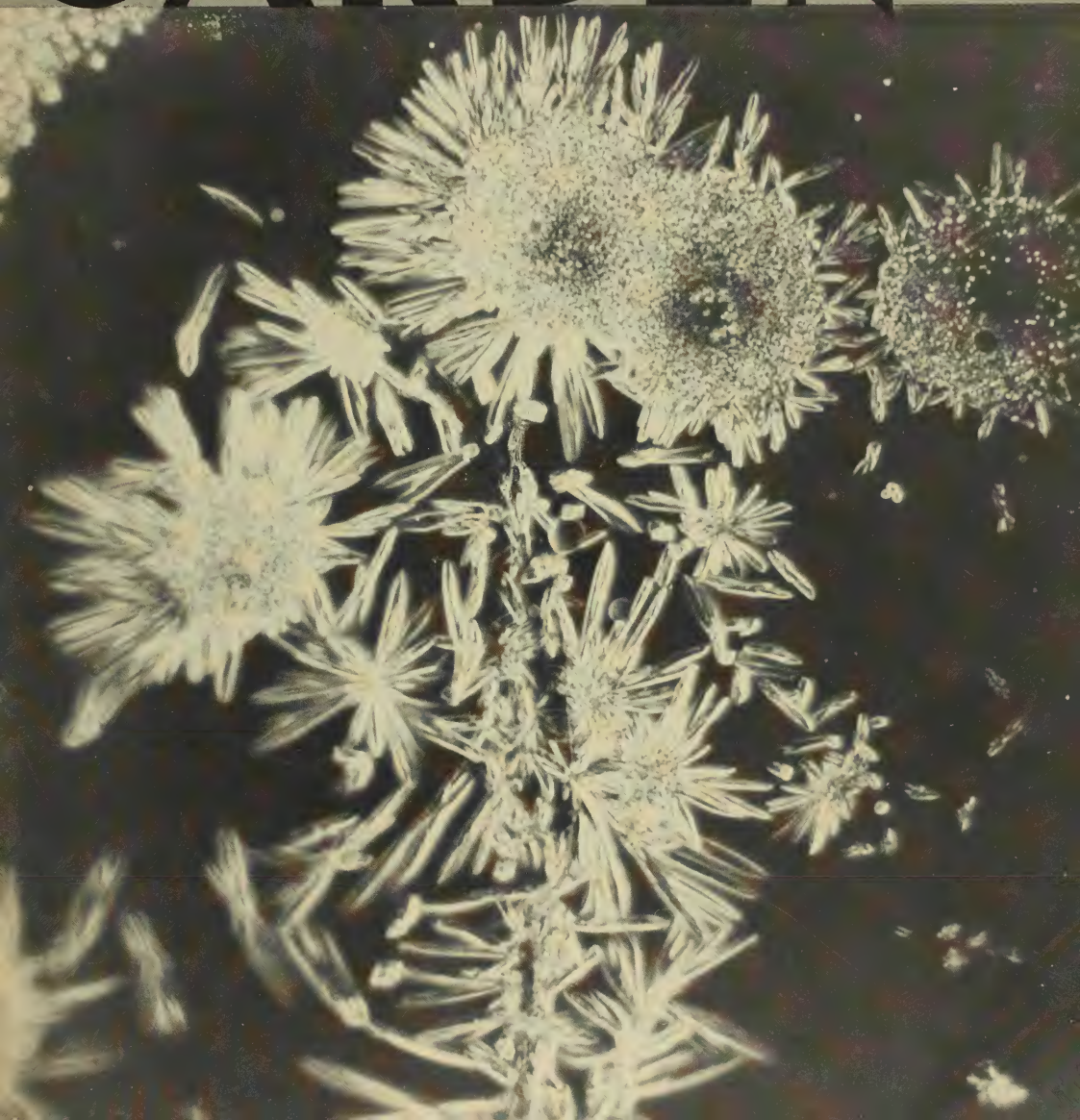

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JANUARY-FEBRUARY 1972

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The San Diego Floral Association

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THE COVER

The cover flowers are photomicrographs of copper sulphate and calcium carbonate taken by Leo C. Massopust, Sr. See story on page 4.

The back cover is a photo by Betty Mackintosh of a fern.

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This is an "in the dark" issue about how plants are influenced by darkness. The Editors thought it would be interesting to explore circadian rhythm in plants. Circadian rhythm pertains to a period of about 24 hours, especially the rhythmic repetition of certain phenomena in living organism at the same time each day. Our authors have responded. We were surprised, you will be, too.

Floral Events...

to enjoy

Floral Association general meetings are on the third Tuesday in room 101 of Casa del Prado, Balboa Park.

JANUARY 18, 1972 (1:00 PM) "The Care and Feeding of Houseplants" Jim Stalsonburg. Jim is an outstanding speaker and writer. He knows San Diego planting problems. This is a great opportunity to learn about inside gardening.

FEBRUARY 15, 1972 (7:00 PM) "Water Gardening" Dr. Leroy Phelps, PhD. Dr. Phelps is a professor of Microbiology at San Diego State University. His hobby is Water Gardening. San Diego is an ideal place for a water garden, and Dr. Phelps will explain how to make one indoors or out - big or small. He is an excellent speaker.

to go

JANUARY 15-16, 1972 (Sat. 3-5, Sun. 10-3) "First Iris Show of 1972 in the United States", Southern California Iris Society. Los Angeles Arboretum, Arcadia. Open to the public. Free.

FEBRUARY 12-13, 1972 (Sat. 2-6, Sun. 10-6) San Diego Camellia Society Annual Camellia Show. Conference building, Balboa Park. Open to the public. Admission $.50.

FEBRUARY 15, 1972 (1:00 PM) "Ikebana, Traditional and Modern", Professor Mutuso Tomita. Mr. Tomita is a Master in the Ohara School of Japanese Flower Arranging. He is from Japan. Sponsored by S. D. Ikebana International. Open to the Public. $2.00 donation. Room 101, Casa del Prado, Balboa Park.

MARCH 20-23, 1972. 1972 Annual State Symposium, California Garden Clubs, Inc. Kona Kai Club, Shelter Island, San Diego. Mar. 20 (2-4) "Coordinative and Conceptual Color in Design" Mr. Kenneth Janes. Mar. 21 (9-11) "Cymbidiums and Meristem Culture" Mrs. Iva Newman. (1:15-3:15)"Proteas, Know Them and Grow Them" Mr. J. Howard Asper. Mar. 22(9-11)"To Be or Not To Be Traditional" Mrs. James A. McBain, (11:15-12:15) "Judging Techniques" Panel. Fees. Information: Mrs. Rosenberg 295-1537.

to tour

For reservations and information call Floral office 232-5762.

JANUARY 19, 1972 (Wed.) Wrigley Mansion, San Gabriel Mission, Winery. $6.00. Leave Balboa Park at 8:30, La Jolla at 9:00 AM.)

FEBRUARY 19 & 24 (Sat. & Thurs.) Indio Date Festival. $7.50. (Members pay $6.50 on 24th.) Leave Balboa Park at 8:30, La Jolla at 9:00 AM.

MARCH 25, 1972 (Sat.) Rancho Santa Ana Wild Flower and Native Plant Garden. $6.00, members pay $5.00.

APRIL 8, 10, 15 Anzo-Borrego Wild Flower Tours. 15th is extended tour to Palm Springs.

APRIL 15 (Sat.) Coronado Tour including luncheon at historic Hotel del Coronado and the famous Coronado outdoor flower show. $6.50 including luncheon and entrance fees.

Mrs. Kirkpatrick will resume her flower arranging classes on the last Monday of each month. Please call the Floral Office for further information.

You are invited to subscribe to CALIFORNIA GARDEN or become a member of

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Acetylsalicylic acid

Pictorial Crystallography

GRACE T. BROPHY

Photomicrographs by Leo C. Massopust, Sr.

NEARLY ALL SOLID MATERIALS in the world are crystalline: Rocks, minerals, animals, salt, sugar, diamonds, aspirin, even parts of plants. The pictures on these pages are crystals, and the effects are startling. They are not flowers. They are various chemicals photographed under a microscope with polarized light.

The artist, Leo C. Massopust, Sr., used his camera to search out slides of crystallized chemicals having artistic shapes and patterns. He varied and controlled the pattern by varying the technique. When the chemical was dissolved in a solvent and a drop of the solution was placed on a microscopic slide, the resultant evaporation formed a pattern of crystals. When a pleasing pattern formed, it was placed under the microscope and photographed immediately.

Although most chemical compounds have characteristic crystal forms when precipitated, the solvent used determine to a great extent the pattern produced during crystallization. For example, a chemical dissolved in water crystallized more slowly at room temperature than when placed over heat or when dissolved in alcohol. Chemicals dissolved in water produced delicate patterns, while those produced by rapid crystallization were coarser. These variables allowed for personal expression and constitute the creative aspect of crystallography.

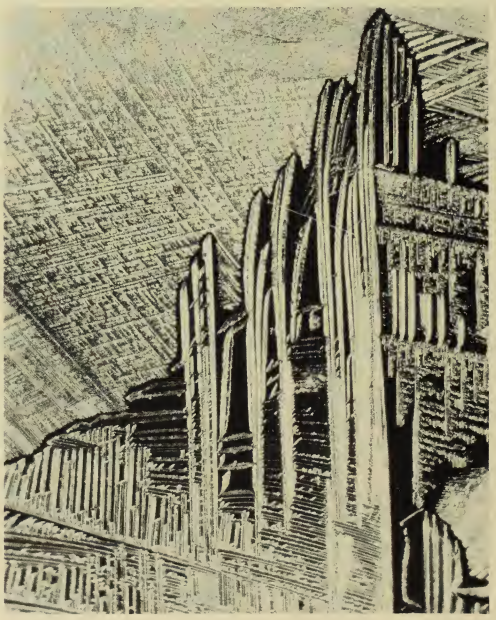
In the proper hands, the camera can be formidable in creating art work of esthetic force. Such is evident on these pages. Leo Massopust never gave his pictures titles and preferred to let people provide their own. Can you see a jeweled city, a weed, a tulip? Can you see a sunflower on the cover of this issue of "California Garden"? As Leo Massopust said, "The artist, by actual sight and mental vision, sees something which stirs him deeply and which he endeavors to arouse within the beholder of his work." We hope you see beautiful things.

Grace Brophy is a medical editor and former Director of Public Information, Marquette University School of Medicine. Leo C. Massopust, Sr. was a friend and associate of hers. The collection of his crystals are framed in her La Jolla home.

This article was made possible through the cooperation of Mrs. Leo C. Massopust, Sr., Dr. Leo C. Massopust, Jr., and Mr. Anthony Kuzma, Director of the Department of Art and Photography, Medical College of Wisconsin.

Unidentified

Thiocarbomide crystals



about the artist...

The late Leo C. Massopust, Sr. was director of the department of art and photography at Marquette University School of Medicine, Milwaukee, Wisconsin (now Medical College of Wisconsin) from the time of its creation in 1917 until his retirement in 1957.

In 1933 he began working with Eastman Kodak Company in developing infrared photography, particularly in medicine, and he wrote dozens of technical articles on medical photography. He was honored repeatedly for his work. He found that infrared photography could be used to photograph blood vessels lying under the skin so as to reveal abnormalities that might indicate various kinds of disorders. One application was in the detection of breast cancer. The method also has been used to visualize clotting in veins of the leg.

He began to take photomicrographs of crystals as an art form in the middle 1930's because he was impressed by the patterns and esthetic coloring of stained histologic slides. They were made purely for the photographic pleasure involved in their creations and not for any medical value.

He compiled a group of plates made from histologic slides of human tissue which he projected and hand painted as suggested patterns for textile prints. These were submitted to the textile industry convention in Chicago in the late 1930's. Some were selected for the industry to be used for dress and suit material.

About the same time, Dr. Eben J. Carey, Dean of Marquette's medical school, started work in muscle endings, and some work was accomplished with certain analogous material such as peisoelectric crystals (by the early 1940's). In 1942 with Dr. Carey, he won the Gold Medal at the annual meeting of the American Medical Association for an exhibit of 150 color photographs of nerve end plates. The medal is the highest award granted to exhibitors at the annual meeting.

In 1950 a group of his crystal prints were shown at the Museum of Modern Art in New York by invitation of the famed photographer, Edward Steichen. The museum has some of his prints as part of its permanent collection.

His pictures also were shown at the Royal Photographic Society of Great Britain (1937) and (1950) and at the State College for Arts and Crafts at Saarbruecken, Germany (1954).

He served as president of the Biologic Photographic Association and was a member of the Board of Directors from 1937-1950. From 1939-49 he was editor of the Journal of the Biologic Photographic Association and was Editor Emeritus from 1950 until his death.

Salicylic acid (aspirin) and a spicule of sponge (cross)

Unidentified

Copper sulfate and calcium carbonate

How to Fool a Chrysanthemum

HELEN V. WITHAM

WHY WOULD ANYONE want to fool a chrysanthemum? Why, to make it flower against its better judgment. What kind of judgment does it have? Photoperiodism (the reaction of plants to hours of daylight and darkness.)

This term was first used in 1920 by Garner and Allard, two U.S. Department of Agriculture scientists who were studying the influence of length of day and night upon the flowering habits of soybean and tobacco plants. They were not the first scientists to note that plants were affected by length of day (records go back to 1686), but they gave us a word to cover the subject--photoperiodism. They classified plants into three groups, depending upon their reaction to daylength: (1) Plants that flowered more quickly when the days were long than when they were short were called "long-day" plants, (2) Plants that flowered more quickly when the days were short were called "short-day" plants, and (3) Plants that were not affected by day length were "day-neutral" or "indifferent" plants.

Experiments have shown that such other environmental factors as light intensity, temperature, and available soil moisture do not of themselves control formation of buds. The important influence, the one that decides things, is the number of hours of daylight and darkness. Actually, it is the number of hours of darkness that counts, but the word "day" is used in the phrases long-day and short-day. Chrysanthemums are short-day plants. We all know this, or thought we did, until quite recently. Aren't mums the stand-by of fall flower shows, Thanksgiving decoration, and football season corsages? Of course, because they flower in the fall, or used to, before we learned how to deceive them.

We hear about biologic clocks in connection with overseas travel. It is now believed that nearly all plants as well as animals have timing systems. The day-night cycle of approximately 24 hours affects plant and animal behavior. Migration of birds, insect metamorphosis, and dormancy of plants all take place "on time." The natural timing systems governing these events are little understood but fascinating to speculate upon. What tells a bird when to fly North? What tells a plant whether to flower in fall, spring, or summer? How does it manage when it is moved across the equator? (It may not bloom at all; it may bloom twice a year, or after 18 months, or all the time and die an early death.) As many as six different behavior patterns have been observed in plants moved here from South America.)

To simplify an extremely complex process involving chemistry, hormones, and photosynthesis, we can say that plants have a timing mechanism; they can "count" the hours of daylight and darkness. They can tell also whether day length is increasing or decreasing.

Chrysanthemums have been cultivated for centuries in China and Japan. Like sweet corn, they have been cultivated for so long that the species exists now only as a cultivated plant--nowhere in the world as a wild plant. Mums are believed to have originated in China more than 2,000 years ago and were introduced into Europe by a Holland merchant in 1688. Brought to the United States about 1800 they became the leading garden, and later, greenhouse plant of the fall season, by "doing what comes naturally."

After Garner and Allard established the fact that flowering time was controlled by length of exposure to daylight, research continued until, by 1946, it had been demonstrated that mums could be flowered any day in the year. To keep the plant growing taller and producing leaves, the daylight must be more than 14 1/2 hours long. To make the plant stop growing vegetatively and initiate flower buds, it must be less than that; and to develop the flower buds, less than 13 1/2 hours. Seasonal changes can be produced artificially, and the plants will respond accordingly.

This is the basis for the chrysanthemum industry that has grown up in recent years in San Diego County. Growing mums as a business is no hit-or-miss operation; it is an exacting science. Every step in the life of the mum and every aspect of its environment is carefully controlled: Propagating, planting, pinching, fertilizing, watering, temperature, the amount and hours of light. The commercial grower sets the date for the plants to flower (sort of like setting graduation day as June 11, or June 15, or whatever) and counts backward from that date. He "tells" those plants when to flower, and the plants pay attention.

"Have a Nice Day" a visit to the mushroom farm

TAZ TAJIMA

HUNTING MUSHROOMS IN THE WOODS has the sound of simple, bucolic pleasures. Although woods were lacking, such were the pleasures of our day when we went in search of mushrooms at the mushroom farm. Located at the end of Broadway in Escondido, far from the neon glitter of most Broadways, the farm sits in its serene setting of valley and hill in the peace of the countryside.

Walking up to the barns which indeed house the farm, we are greeted by its genial proprietor who is most hospitable and generous of his time. We didn't just come, buy, and go, but sensing our interest, he donned his graphite miner's lamp--an intriguing bit of head gear--and lead us on a tour of his mushroom barns.

The houses are composed of six tiers of compost beds arranged in two rows with a center alley and a passageway around the perimeter. There is a cat walk at the fourth level. The houses, as is traditional, are built against a slight slope with one entrance at the cat walk level.

Since mushrooms contain no chlorophyll to manufacture their own food, no light is necessary for their growth. The best temperature for production is a range of 53° to 60° F. In air conditioned splendor the mushrooms -- a "night bloomer" -- spend their life span in perpetual darkness.

Mushroom culture is a good example of the modern ecologic technique of recycling. Horse waste is the ideal compost, and the proximity of Del Mar was an important factor in the location of this farm. The green manure is composted, and at the proper time, the freshly and immaculately cleaned houses are filled and the compost goes through a pasteurization process. By this time there is no bad odor, just a clean, damp, earthy smell. The next step is "spawning," which means planting in the jargon of the industry. The spawn is usually purchased from companies specializing in its culture. In two to four weeks the mushrooms "pinhead" and develop into buttons and marketable mushrooms. This occurs in rhythmic waves called breaks. There are three or four waves and then mushrooms in all stages are to be found--from pinheads to full caps. With humidity and temperature properly controlled, the beds will produce for about six months and then must be emptied and refilled with fresh compost.

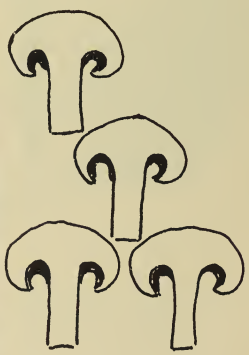
At this stage the third part of our ecologic drama takes place. The used compost is sold to gardeners, and many a load of compost has found its way to the iris beds of our fellow subscribers.

After the completion of our tour, our genial proprietor answered some questions along culinary lines. Among other things he told us how his wife marinates mushrooms. She brings salted water to a boil, removes it from the heat, and pours in the washed mushrooms. After five minutes they are drained and then marinated in a French dressing.

Very conveniently situated right next door to the mushroom farm is a chicken ranch; so to our fresh mushrooms, we shoppers add the treat of freshly laid eggs. And these were not our only purchases, for no trip to Escondido is complete without a detour to the nut farm. On the way there a bonus looms up in the form of a pick-up truck filled with just picked fruits and vegetables, so more wonderful fresh produce is added to our loot of the day.

Simple country pleasures--fresh food, good friends, and company. We had a nice day.

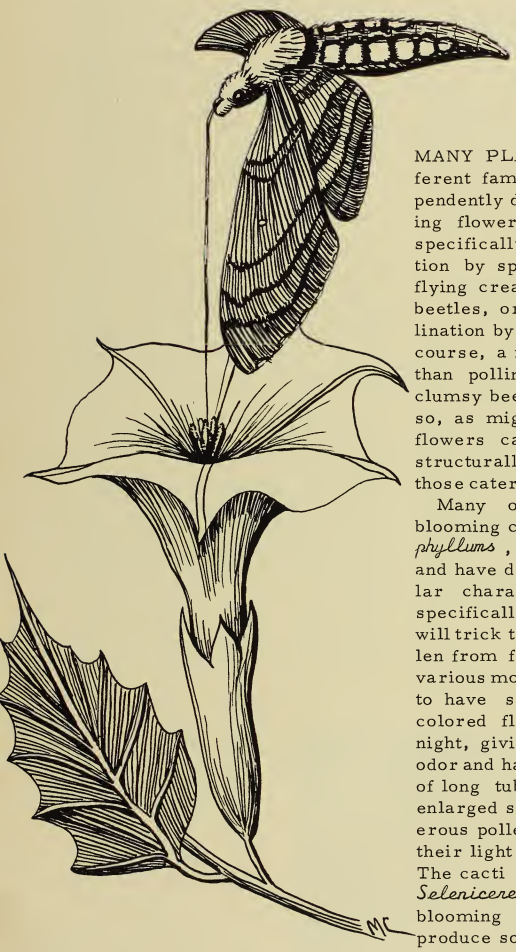
Two friends of the author, Melanie Mayer and Katherine Sanford, pile the day's treasures into the trunk of a car.



Taz Tajima, is a member of Ikebana International and the La Jolla Garden Club.

POLLINATION in the dark

MARIE HOFF COX



Tomato Sphynx Moth *(Protoparce sexta)* pollinating Jimsonweed (Datura)

MANY PLANTS from very different family groups have independently developed night blooming flowers many of which are specifically adapted for pollination by specific kinds of night flying creatures such as moths, beetles, or even bats. The pollination by a delicate moth is, of course, a much different matter than pollination by a relatively clumsy beetle or a heavy bat, and so, as might be expected, those flowers catering to moths are structurally quite different from those catering to beetles or bats.

Many of the various night blooming cacti, such as the *Epiphyllums*, are moth pollinated and have developed certain similar characteristics which will specifically attract moths and will trick them into carrying pollen from flower to flower. The various moth pollinated cacti tend to have showy light or white colored flowers which open at night, giving off a strong, sweet odor and have nectar at the bottom of long tubes. Many also have enlarged stigmal lobes and numerous pollen laden stamen to dust their light and fleeting visitors. The cacti belonging to the genus *Selenicereus* known as the night blooming cerei or moon cerei produce some of the largest cactus flowers in the world with the nectar at the bottom of a deep tubular center up to nine inches long in the Queen of the Night flower and intended for only those night flying tropical moths which have an exceptionally long proboscis or "tongue." Some of the most beautiful orchids are also specifically designed for moth pollination. The April, 1971, issue of National Geographic Magazine has a fascinating article on "The Exquisite Orchids" by Luis Marden which tells of the White Christmas Star Orchid (*Angraecum sesquipidale*) from Madagascar which has the nectar at the base of a foot long tube and which can only be pollinated by the Hawkmoth *Xanthopan morgani praedicta* which has a "tongue" of twelve inches.

Of all the nectar sucking moths the sphynx or Hawkmoths are probably most spectacular, flying from flower to flower in a strikingly hummingbird fashion. The two most common species in North America are the White-lined or Striped Morning Sphynx (*Celerio lineata*) and the tomato Sphinx (*Protoparce sexta*) parent of Tomato Hornworm. The larvae of the White-lined Sphynx feed on Portulaca and some Evening Primroses and Soapworts which are moth pollinated. Their "Tongue" is about an inch long, and they are effective pollinators of those flowers with anthers and stigma projecting out about an inch from the nectar source. The "tongue" of the Tomato Sphynx is

Marie Hoff Cox has a Masters Degree in Biology from San Diego State. She is active with the Audubon Society.

much longer, however, around three inches long, and they are probably more effective pollinators of deeper flowers. They feed from Jimsonweed, Tobacco, Tomato, and various other flowers, and the larvae feed on potatoes, tomatoes, and other Solanaceae.

The larvae of the Pink Spotted Hawkmoth *(Herse cingulata)* feeds upon the sweet potato and other Convolvulaceae, and the adults are probably important pollinators of some morning glories. Indeed, its close relative, the European Bindweed Hawkbill *(Herse convolvuli)* is an important pollinator of the European Bindweed *(Convolvulus sepium)*, and this plant does not grow far beyond the natural range of the moth in Europe, even though it could be pollinated by other moths. Perhaps the fact that the flowers are almost odorless limits its attraction to other moths and makes it more dependent on the one species which is attracted to it.

Many of our tiger lilies are also specifically adapted for moth pollination. The Turk's Cap Lily is a typical example which is pollinated mainly by the Hawkmoth *Macroglossa* in Central Europe. The nectar is contained in six different chambers inside the one-inch tube. The anthers have enlarged pollen sacs and are attached by small hinges which allow them to swing freely shedding pollen at the slightest breeze from a beating moths' wings or touch of its proboscis. Since the "tongue" of *Macroglossa* is about an inch long, it must get its "nose" powdered in order to get the nectar and must furthermore enter the flower six times, passing by the pistil each time.

Many Phlox are also moth pollinated and Verne and Karen Grant have written a book on "Flower Pollination in the Phlox Family" (1965, Columbia Univ. Press, N. Y.).

There are also some plants which are adapted to pollination by night flying beetles. These are less apt to be light in color and attract the beetles instead by strong, usually unpleasant odors sometimes accompanied by heat. Many of these beetles are scarabs (related to May Beetles) or dung beetles which are attracted by odors like decaying meat or fish. The beetles are often trapped for a day or two during which time they are rewarded by eating nourishing plant materials. They are later thoroughly dusted with pollen and released to seek another flower. The first night in the new flower they effect pollination of the receptive ovary insuring cross pollination before the flower's own pollen ripens.

The spicebush, *Calycanthus occidentalis* is a beetle pollinated shrub of Northern California found along streams and shady canyons. It produces dark red flowers from May to September which give off a strong wine odor which lures the flower beetles, *Colopterus truncatus* (*Nitidulidae*) inside through a small conical opening. Once inside, the beetles are confined to a specific food chamber by long hairs all about the inside of the flower which prevents them from leaving. In 12-36 hours the anthers open and dust the beetles, the flower opens and withers, the odor disappears, and the beetles fly off to another blossom. The beetles are not totally dependent on the spicebush for food and are found in areas outside its natural habitat, but the spicebush appears to be totally dependent upon these beetles and is limited to those areas where they are available.

Some other beetle pollinated flowers include Magnolias, Peonies, other Ranales, and at least some water lilies. Many of the pollinators mentioned above and others are discussed in Meeuse, 1961, "The Story of Pollination," the Ronald Press Co., N. Y.

Of all the night pollinators, probably the most amazing are the bats, and many different types of plants have developed flowers specifically to attract them. Some old world bats have had such long associations with flowers that they no longer eat any insects but eat only the pollen and nectar from specialized bat flowers. Here in America, however, the bats that feed on nectar and pollen still include some insects in their diet. Bat flowers are magnificent, sturdy, large, white, cup shaped flowers with deep, large stores of nectar. These flowers also usually give off an unusual and not particularly pleasant odor which is attractive to bats. Two of our most interesting bat pollinated flowers are produced by the Saguaro or Giant Cactus *(Carnegiea gigantea)*, which is a dominant plant of the Sonoran Desert extending south into Mexico, and the Cardon *(Pachycereus pringlei)*, which is mainly found in Baja California.

The Cardon blooms from March to May, and the flowers have a strong melon odor. They are open from late afternoon or evening until about noon the next day and although they are probably originally and primarily pollinated by bats during the night, they are also visited by woodpeckers and orioles the following morning which may allow additional chances for pollination. The quantity of strong smelling nectar also attracts many bees, flies, and other insects during the day. Dr. Reid Moran, curator of Botany at the San Diego Museum of Natural History, has written an interesting article on this Cardon in the California Academy of Sciences publication, Pacific Discovery, March-April, 1968.

The Saguaro, or Giant Cactus, the State flower of Arizona, blooms in Spring, each flower opening for one night and usually lasting into the following afternoon. Experiments by McGregor, Alcorn, and Olin (Ecology, 43: 259-267, 1962) showed that pol-

Epiphyllum sp. probably moth pollinated-showing enlarged stigmal lobes.

lination of the Saguaro was effective between flowers of different plants but rarely between flowers on the same plant. They also ran controlled experiments using honeybees, Western White-winged Doves, and Long-nose Bats showing that each pollinator alone was as effective in total setting of fruit as found naturally in the field. In April and May both the long-nose bats and the white-winged doves migrate into Arizona, and both are known to feed heavily on the Saguaro blossoms. In the evening the bats are the first to visit freshly opened Saguaro flowers and feed on both pollen and nectar, thrusting their noses deep into the nectar bowls, their faces covered with pollen. They are the primary pollinators. In the morning the white-winged doves drink, immersed up to their eyes in pollen, and further pollination continues. Various moths, the Hog nose bats, wild bees, thrashers, Cactus Wrens, Gilded Flickers, and Gila Woodpeckers also visit these flowers. Effective as the honeybee may be, it was only introduced into the American Southwest about a century ago, so it cannot be credited with producing the large stand of mature Saguaros which average some 175 years old.

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Everyone is talking about

THE HYDROPOD in the Floral Association room is the only garden in the "Garden Center". It is an "in the dark" hydrophonic garden. Although one of the loveliest sights in the World, the Balboa Park lily pool, is but a few feet away, not one glimmer of sunlight enters the foot thick walls. No fresh air enters the triple locked door, and already the air smells of stale tobacco and house atosis. A timer turns an "electric sun" on and off. Another timer causes nutrients to circulate. It's a wonderful, fresh, living thing - our garden! We have a fine crop of Periwinkles and the parsley is robust. The cyclamen is sending out new blooms, too. We are going to try to grow other things, perhaps a bit of mint for our tea.

Evening Perfume in the Garden

GEORGE JAMES

FLOWERS WITH A DELIGHTFUL ODOR can add another dimension to gardening. Most of these flowers are not too large or showy, some being inconspicuous, but the odors that emanate from them more than make up for their lack of size or bright color. In Flowers the scent is the strongest after dark.

Bouvardia longifolia 'Albatros' is a delicate shrub which has clusters of white, trumpet shaped flowers during the warm months of the year. They are intensely fragrant. There are pink and red varieties whose flowers are smaller and lack the fragrance of the white. All varieties have been used by florists for corsages.

Brunsfelsia American, 'Lady of the Night', had intensely fragrant flowers which come several times during the warm months of the year. There are several other varieties more likely found in nurseries, but they lack the perfume of this one with flowers which are white to cream in color.

References list several varieties of *Cestrum* but only three have a fragrance that is strong enough to be noticed at any great distance from the plant. *Cestrum nocturnum* "Night Flowering Jasmine", grows quickly and easily and will start itself from seeds in the garden. Its night scent can be overpowering, so those who are easily disturbed by strong odors, even when pleasant, might want to plant it some distance from windows that are usually open at night. The flowers are white, in clusters, and appear in late summer or fall. *Cestrum parqui* has greenish-yellow flowers, the leaves are narrower, but the scent is the same. *Cestrum diurnum* is known to some as "Day Jasmine." It has dreamy white flowers during the warm months, and a strong, pleasant odor which is released during daylight hours.

The *Pittosporums* are an important family of plants used in landscape plantings, and some varieties are known for their ability to perfume the air, day or night, for some distance around the plant. *Pittosporum eugenoides* "Lemon Wood," has clusters of small, yellow flowers in the spring when not pruned too much. *Pittosporum phillyraeoides* called "Desert-willow" because of its drooping habit, has small yellow, bell-shaped flowers in the winter. *Pittosporum tobira* "Mock Orange," has clusters of creamy-white flowers in the spring. A variegated form is less free-flowering. *Pittosporum undulatum* "Victorian Box," is a large shrub or tree that has clusters of creamy-white flowers during the spring.

Plumerias are known to visitors to tropical parts of the world for their delightful fragrance. They are considered marginal here, but where the proper situation can be found, they will grow. They will be nearly leafless during the winter. *Plumeria obtusa* flowers during the warm months with large, white flowers. *P. O. actifolia* has white to pink flowers with a yellow center. There is a dwarf variety, too.

The *Sarcococca* family consists of several shrubs which are useful for landscape planting, especially in shaded areas. They are slow growing and dense and have shiney foliage. The varieties most likely to be found in our area are *S. humilis* a low growing, spreading plant and *S. ruscifolia* which grows slowly to a four to six foot bush. Both varieties have small white flowers in the spring. The flowers are hidden by the dense leaves, and are very fragrant.

Datura sauveolens, "Angel's Trumpet," has white flowers with greenish veins which may be 8 to 10 inches long and are trumpet shaped. The plant is large and not too attractive, and all parts are poisonous if eaten. It scents both day and night and should be planted where not too conspicuous but where the benefit of the scent can be enjoyed.

A good reference book for our area, "Plants for Subtropical Regions," by Roland S. Hoyt or "Sunset Western Garden Book," revised edition, should be consulted before planting any of the plants listed. A good reference book will give detailed information about the needs of the plant as to water, soil, and location. The successful growth of any plant depends upon the gardener's understanding of the plant needs and being able to meet those needs.

More next month on scented plants.

George James is an experienced horticulturist and is a teacher of gardening.

"Anoint Thee Witch"

JOSEPHINE GRAY

THE HISTORY OF HERBS is heavy with mystery and magic, and even our ordinary culinary herbs such as marjoram, basil, and parsley were sown with ritual in the waxing of the moon, and harvested with apologies to the plant. All herbs were not benign, however, and a great many people must have died discovering which were good and which were dangerous, and witches boiled up nauseous messes to add to the toll.

Nearly every district in the old world had its witch living on the outskirts of the village in a filthy hovel surrounded by a tangled unkempt garden where she grew the plants for her evil brews. Among them was undoubtedly aconite, a chief ingredient in the "flying ointment" with which she smeared herself before taking off in the rush of a midnight storm on her ragwort horse or the bundle of broom twigs tied to an ash handle, to meet with her coven. Others would have been night shade and adder's tongue, moonwort and leppards-bane, for certainly, in spite of the window dressing of bat droppings and dead men's nail parings she must have a knowledge of herbs and their properties and something of a method of extracting the drugs.

We think of witches and their horrid Sabbaths on Walpurgis Night, their dim and smoky huts where three legged cauldrons forever bubbled and gave of evil stenches, where on black and stormy nights frightened men and women stumbled to the threshold. Souls trembling in terror of the night and of the way through the wind thrashed wood and over stony hillsides, frenzied in hate or love or greed, undoing the bit of rag to show a few coppers which were payment for a spell.

Who was this witch before she became a snaggle toothed crone with the ability to change herself into a fox or a shrew-mouse or the neighbor's cat? Could she once have been a pretty girl, a still-room maid to the Lady of the Manor and learned the virtues of hemlock and mandrake before she found their evil uses? Besides the herbs grown in the manor garden she would have known where to find the wild and rare ones in woods and fields, and she would have known how and when to reap and cure them. She would have grown pennyroyal and poppies long before she came to use them in a potion for the cowherd's wife who kept having too many little girls.

What would bring her to this dark and stony hillside? Perhaps she fell a-foul of that most ancient of difficulties and was cast out without money or possessions to the best she could. In the long run she did pretty well, for there were always people who wanted something they hadn't got. Betty Hygeart, tired of an old husband might come shivering in the cold rainy dark to ask for a charm, and for the few coppers, be given an ancient rune to memorize and a distillation of henbane or hemlock. The rank steam from the boiling cauldron, the wavering rush light, the cold sweat of fear all made the liquid in the dirty leather bottle she carried away, more potent.

Whatever else went into the witches stock pot, the darkest characteristics of human nature envy, greed, hatred, and fear went into it also, and "double double toil and trouble" was truly the watchword.

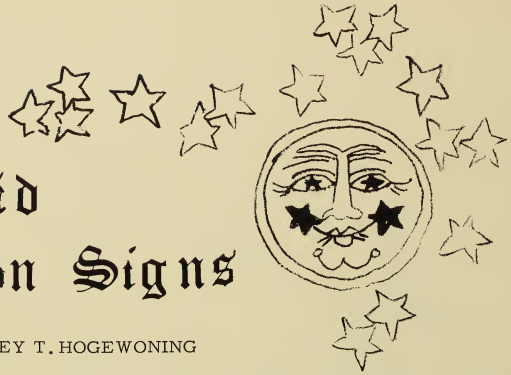
Herb Tea

TRIED AND TRUE.....
NO WITCHES' BREW!

Instead of using sleeping pills, it might be worth while to revive the old custom of having a tisane at bedtime for quiet sleep. Pick a generous tablespoon of lemon balm, peppermint, or spearmint and pour a cup of boiling water over it and let steep for five minutes or more. I put a little brown sugar in mine, not only to sweeten it a bit, but because it colors it as well. If you use dried leaves it is well to remember that you use half as much as you would if they are freshly picked.

Josephine Gray researches, grows, and uses herbs. Her garden in Rancho Santa Fe is a delight.

Gardening with the Aid of Moon Signs



COREY T. HOGEWONING

GARDENING HAS BEEN MY HOBBY as well as my livelihood for the greater part of my life. It all started at the age of 12 when I was assisting my parents in planting acres in potatoes. The man hired to do the plowing came two weeks earlier than requested. This did not make any difference to us three children who planted the potatoes behind the plow in every third furrow. (We did this for many years.) What did make a difference was Mother's complaining of what a waste it was to be planting potatoes at this particular time.

The crop looked beautiful during the growing season; the harvest time was something else. As a child I thought it was shocking and something to remember. The crop we dug was just a few potatoes no bigger than marbles. I certainly felt defeated. It was then I learned why Mother had been so unhappy at the planting time. She informed me that when the moon is in its first quarter it is not the time to plant any crop that produces underground. It is ideal for all that edible food that grows above ground level, such as beans, peas, lettuce, and so forth.

In the last 25 years I have seldom planted anything unless I consult the Moon Sign Book, a paper-back volume that comes out new each year and is carried by most book stores. There you find the fruitful signs as well as barren, wet, dry, earth, and fire signs. All these signs are good for certain adventures in garden projects. For example: The wet or moist sign is the ideal sign to water the garden. Some days, when watering, I notice it runs off instead of penetrating the soil. When I check the book, sure as I am writing this article, I find the moon is not in a moist sign but in a dry or barren one. Being in the gardening business I find it pays to always check the signs before propagating any plants to save waste of both time and materials.

The same is true of pruning. To improve the crop or condition of the tree or shrub, it must be pruned in the first or second quarter of the moon, in a fruitful or productive sign such as Cancer, Scorpio, Pices, etc. To retard growth, prune in the third or fourth quarter with the moon in a barren sign. That is also when you should weed or spray for insects. If the above jobs were done in the first or second quarter under a fruitful sign, both weeds and insects would continue to multiply. These same principles apply to fertilization as well as many other things, not only in gardening but in everything that we do in every day life.

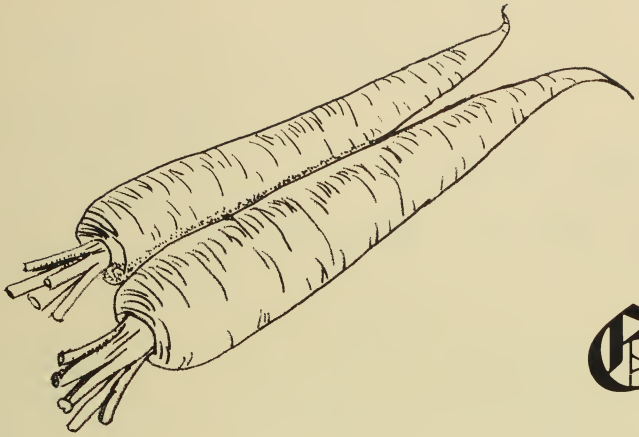
The moon has a very strong effect on everything on this planet Earth. I would say you better believe it. Ripley would say believe it or not.

Corey T. Hogewoning, manager and caretaker of Hillside Nurseries in La Jolla, loves to grow plants and is considered an authority on begonias.

WE KNOW that all celestial bodies effect the earth by mutual gravitational attraction. The effect can be seen in the tides of the ocean. The sun, because of its large mass, and the moon, because of its nearness to earth, are the most important. The moon is the dominant factor in controlling the period and height of the tides. Near the time of the new and full moon the gravitational force of the sun and moon are aligned. This produces the highest and lowest tides. Near the first and third quarter the daily tidal range is lower.

Recent experiments have shown microscopic movements in large buildings caused by these gravitational forces. It is logical to assume that soil particles can be effected by the gravitational forces of the sun and moon. B. J.

A botanist at the NASA Manned Spacecraft Center has discovered that powdered rock from the Sea of Tranquility on the moon caused plants under controlled conditions to grow faster than those without a sprinkling of moon dust. B. J.



GOOD

CARROTS ARE GOOD, and they are one of our oldest vegetables. How old, no one knows, but the first records go back to the Fifth century in Spain when the Moors established market gardens and maintained them until the 11th century when they were pushed out of Spain. Carrots were known in Italy, Belgium, and the London markets in the 16th century. Castle and monastery gardens grew them in the Middle Ages. When the French discovered them, they turned their genius to cooking and developing the carrot until certain varieties are still known by the French names of Nantes and Chantenay. Our most glorious recipes are still the ones the French invented. Custards, cakes, casseroles, fried, candied, steamed, flavored with ginger, oranges, pineapple, raisins, sesame seeds. Raw sticks and curls, grated and shredded; name it and the French have used it.

Along roadsides and meadows in many parts of the world a weed grows with ferny leaves and umbels of tiny mauve blossoms that is known as the wild carrot or Queen Anne's Lace. It is from this weed of the genus *Daucus* that our crisp, orange root has been developed. Botanically it is of the family *Umbelliferae* and its full title is *Daucus carota sativa*.

No doubt the bright orange color and sweet, crisp texture of the root had quite a bit to do with the popularity. Even though the scientific age did not arrive until late in the 19th century, people had lived for ages and had made their own observations. By trial and error, they knew certain foods had health giving properties. They did not know that it was carotene, the orange substance in the carrot that harbored Vitamin A which the body used to cure night blindness and eye infections, skin diseases, tooth decay, and prevented gall and kidney stones. But they did know that eating carrots helped all these problems. Even the poor ate the coarse big roots raised for horses and pigs and knew they were better for it.

It was not until 1912 that biochemists announced there were mysterious elements in foods that they called vitamins that were the main key to nutrition and health. By the mid-twenties they had isolated these elements and had begun testing on rats to learn which ones did what. In the Thirties it was pretty well established that the Vitamins A to K had their separate fields of control, and in what foods they were found. Carotene in which Vitamin A is found exists in many foods, but in the carrot it is concentrated. Vitamin pills were then available which set off a great propaganda campaign which is still rolling. These pills have helped people with diet deficiencies, especially those who would rather take a pill than eat a balanced diet. But vitamin pills can be very dangerous unless prescribed for definite deficiencies. Doctors and nutritionists advise that eating a balanced diet is far superior to taking pills. Vitamin A is a potent one and should never be taken casually, for in excess it can be fatally poisonous.

Weight loss lists do not have many carrots on them, but they are not too caloric. A cup of cubed cooked carrots contains only 44 calories, but its vitamin and mineral content is impressive:

116.2 international units of Vitamin A
1.4 milligrams of thiamin
1.5 milligrams calcium
2.4 milligrams iron
2.6 miligrams Ascorbic acid (C)

Rosalie Garcia, our adventurous vegetable gardener, researches, grows, uses, and loves plants.

OLD CARROTS

ROSALIE GARCIA

At any season there are carrots in the markets. California in her San Joaquin, Imperial, and Salinas Valleys, and Texas in her Rio Grande Valley plant 72,000 acres to carrots and sell for $80,000,000. They put in three crops a year. Many other states grow lesser amounts, and millions of home gardeners raise unknown amounts. So there are plenty of carrots around.

Anybody can raise carrots if certain growing conditions are met. It takes more patience than radishes and lettuce, and the prime condition is sun and soil. The carrot is primarily a cool weather vegetable and does best when planted in the fall and spring. They will grow in hot weather, but they need plenty of water and are not so tender. The ideal soil is a deep sandy loam, over a foot deep in a sunny spot. Raised beds, deep boxes and even clay pots will produce small supplies. The ferny foliage makes pretty borders in flower beds. Good drainage and irrigating produce the quick growth necessary for the tender juicy root.

Varieties of carrots come in root lengths from 8 to 10 inches, graduating to one or two inches. They may have tapering terminals or blunt and stubby ones. Most of them have cores, but there are new hybrids that are coreless. What variety one plants depends on the depth of one's soil. The long slender ones most often seen in the markets are varieties of Imperators. These need a deep soil up to 18 inches, or the roots will divide and become twisted. A Nantes or Danvers variety will be 6 or 7 inches, with a blunt tip and should have 10 inches of soil. Some will grow in a heavy soil of 6 or 8 inches, and the stubby Oxheart or Chantenays thrive under those conditions. The tiny Baby Fingers, the darling of the French cooks, are no longer than two inches and about the size of one's little finger, and they are ready for use in about 50 days. Read the description on the seed packets which are quite definite, and follow faithfully for best results.

Carrot seeds are small, hard and dry, and must be fresh or they will not germinate. Sow in rows or beds one half or three-fourths inches deep and cover seeds with a moisture preserving mulch, or a strip of burlap which can be kept moist. Don't give up and think nothing has happened, for it takes two or three weeks for seeds to germinate. When tiny green hairs like a fuzz begin to show, take off the burlap, but keep the mulch damp. When these green hairs are about an inch high, thin to about an inch apart. Three or four weeks later when tiny golden knobs are formed, thin again to about three inches apart. Save these thinnings as gourmet morsels known only to home gardeners. From then on, the idea is to get them to grow fast to have crisp juicy roots. Even then, from time of planting to maturity is about three months --up to three weeks to come up and 70 to 75 days to mature.

Carrots will stay in the ground for weeks after they are mature, but those with cores will get woody and stringy. They store well in a cool dry place. The keeping quality of the carrot inspires it to be such a commercial success. When buying carrots, note the stem end to see if the core is wide, for that indicates that it is past its peak and will be strong and tough--those piles that are 2 pounds for fifteen cents--in the good old days. Carrots lend themselves to canning and freezing and can be so processed at home easily.

The good old carrot is ever with us. Be grateful for it, and eat one every day for good health and well being.

Bean Sprouts

SOYBEANS, *Glycine max*, are one of the five sacred grains of China and have been used for at least 4,000 years. There are over 1,000 varieties grown in the Orient, and over 10,000 varieties are known. Beans are one of the few vegetable sources of amino acids, and soybeans have a high protein and amino acid content. For many in the Orient they are the main source of protein and amino acids and are eaten in seed form, ground as a meal, pressed as a milk, and made into a so-called "bean cheese," bean curd. Fermented forms eaten are soy sauce and bean paste. During the cold winter months when no green vegetables are available, bean sprouts which contain Vitamin C are eaten. In Southern California where fresh, green vegetables are always available, bean sprouts cannot be considered an important addition to the diet. But, they are delicious, will add variety to meals, are an essential part of some oriental recipes, and do grow in the dark without soil in a small space.

A bean seed consists of a seed coat and the Embryo. When the seed coat is removed, the fleshy inside will break into two parts, the cotyledons or seed leaves. If one looks closely one can see several young foliage leaves and a rudimentary stem and root. When moisture and heat are present, digestion takes place, cell division occurs, the seed coat ruptures, and the rudimentary root emerges followed by the rudimentary leaves. The nourishment comes from the cotyledons. The plant must have another source of food or it will die when the stored food is used. Any seed can be grown and germinated without soil. A bean sprout is this freshly germinated plant which is using stored food.

Some of the "new world" food oracles claim that one should eat seed sprouts instead of seeds because all of the essential proteins and amino acids are the same and only the starch is gone. This is not true. Several botanists and a doctor of medicine verified this. Mrs. Wheeler, a Home Economist with the U. S. Department of Agriculture, said that soybeans contain very little moisture, and that sprouts are 86.3 per cent water. One hundred grams of soybeans contain 34.9 grams of protein, and that one hundred grams of sprouts contain 6.2 grams of protein. The amino acid is gone, but vitamin C is present. Three and one-fourth ounces of beans contain 75 calories while the same weight of sprouts contains 28 calories.

GROWING SEEDS

Use mung beans, available in oriental food stores, or soybeans. One-half cup of beans will yield about one and one-half cups of sprouts. One hundred grams of mung bean sprouts contain 2.7 grams of protein and are 92 per cent water. The following are the four most popular ways of growing sprouts:

Gourmet method: Wash beans and soak overnight in warm water. Drain and wrap in a damp towel. Place towel in a colander in a dark warm place for three days. Wet towel morning and night with warm water and toss the seeds to keep them from rooting into the towel.

Glass jar method: Place layer of seeds on bottom of jar. Dampen with warm water. Place mesh or cheesecloth over mouth of jar. Keep damp, not wet.

Food Oracle method: Place layer of seeds on wet paper towel in bottom of plastic container. Add water daily.

Japanese method: A bean grower in Tokyo whom the author knew sprouted his seeds in shallow trays with screen bottoms. The trays were placed one above the other in tall racks in a dark, moist, warm room. The trays were sprayed with water several times a day. The author uses a plastic rice washer in a plastic tub covered with foil. Warm water is added daily. Water is allowed to remain in the bottom of the container, but does not touch the beans.

If you have never eaten bean sprouts as a vegetable, try this Oriental method. Fill a sauce pan with washed sprouts. Turn the heat to high. Start turning the sprouts. As they warm, water will be released. After about three to five minutes add a sprinkle of Aji-no-moto (monosodium glutamate) and some soy sauce. Serve warm and crispy.

BARBARA S. JONES

Growing With Lights

DOROTHEA ORNDORFF

IF YOU HAVE empty space in your den, an empty room, or live in an apartment where you would like to have a small garden, then light gardening is for you.

A light garden can be on an expensive set of tier shelves that can be ordered by mail or on a set of shelves made by a handy husband or in a styrofoam picnic basket with a light fixture in the top. The advantage of the picnic basket is that it can be picked up and moved whenever one desires. Sometimes a kitchen counter top may be used.

Mrs. T. M. O'Reilly, La Mesa, has a 48" fluorescent light fixture that can be raised and lowered as the plants grow with two Gro-Lux wide spectrum lights placed about 18" above her plants. She keeps this in her kitchen because she hybridizes begonias, and she can keep a close check on her seedlings and rare cuttings of plants received from outside of the United States. Mr. and Mrs. P. Paul Lee, San Diego, use several 48" units with two 8' Gro-Lux wide spectrum lights for propagating begonias and other shade-loving plants. Their home is on an edge of a canyon, and their greenhouse growing area is too shaded to grow and raise plants properly without the use of this type of fluorescent lighting. My husband uses the styrofoam picnic basket with an 18" Gro-Lux light in the top. He raises rex begonias from leaves. He can take this to flower shows to show other how easy it is to propagate these plants.

Tropical fish tanks can be used to grow small plants by using light fixtures, too.

Dorothea Orndorff is a well known grower who experiments with new plants and shares her knowledge with others.

Mrs. Laura Gistin, Riverside, has two units, built by her handy husband, that are 5' long, by 57" high. Three sets of 24" wide trays, 22" apart are lined with ten mil plastic sheeting that is waterproof, sunproof, mildew proof, and shatterproof. Fluorescent light fixtures are placed underneath the shelf above giving her actually four shelves for plants. She uses one warm white and one cool white light which are alternated with Westinghouse Plant-Grow lights. She recommends changing one's lights when the leaves of the plants start bleaching out lighter than normal.

A furniture cabinet designed as an indoor light garden but serving as a piece of furniture for use in the home, office, school, apartment, or other locations where a decorative furniture piece is desirable was described in the Jan/Feb 1971 issue of "Light Garden" magazine. Another excellent location would be in a nursing home for the elderly, or extended care medical facilities. Patients who like to garden could have the benefits of watching and caring for the plants.

Most growers state that they have their lights on a timer for at least 12 to 14 hours a day. One thing to keep in mind at all times is that all plants growing under lights should be checked frequently to make sure that they are kept moist. Plants need to be fertilized more frequently, too.

One can grow house plants, African Violets, begonias, foliage plants, ferns, various members of the gesneriad family, etc., because it is not the light the plants object to but the heat. Bulbous type plants and orchids can be grown under lights with flowering controlled. With proper temperature and light cycles, annuals, perennials, rock garden plants, cacti, shrubs, etc. can be grown and flowered under lights. Commercial growers are having very good results growing such crops as melons and lettuce in Imperial Valley. Florists have been using lights to produce excellent crops of chrysanthemums, lilies, poinsettias, carnations, and other gift plants. Have you ever driven down Interstate 5 late at night between Oceanside and Del Mar and seen all the lights on in the commerical greenhouses? Such usage is not as extensive as in Europe where most commercial greenhouses are growing under light two or more plant crops a year.

The success of the indoor garden, and to a large degree, the satisfaction one derives from it, may depend on the choice of plants grown. Suggestions about the choice of plants and methods of plant culture are given in recent books: "Fluorescent Light Gardening" by Elaine C. Cherry; "The Complete Book of Gardening Under Lights" by Elvin McDonald; and the newly revised edition of "Gardening Indoors Under Light" by Frederick and Jacqueline Krans. Also write for: United States Department of Agriculture Home and Garden Bulletin #82, "Selecting and Growing House Plants," and "Gardening Under Artificial Lights", Handbook No. 62 from the Brooklyn Botanic Gardens, 1000 Washington Avenue, Brooklyn, New York, 11225, $1.50; Bulletins 0-262, 0-286, and 0-327 Sylvania Electric Products, Danvers, Mass.; and to the Indoor Light Gardening Society of America, Mrs. James C. Martin, membership secretary, 1316 Warren Road, Lakewood, Ohio, 44107, $5.00 a year for six issues of the "Light Garden" magazine.

Hydroponics

TED DILLINGHAM

FEEDING PLANTS a scientifically compounded mixture of nature's elements dissolved in water constitutes the basis of hydroponic growing. The pure science of hydroponics is to grow plants with their roots suspended in a tank of nutrients and water with bubbling oxygen.

Plants which are grown hydroponically grow in an environment of perfect nutrient balance. The tiny root ends of the plant assimilate the proper proportions of mineral elements which are necessary for their individual growth. The roots are supported by the aggregate which, after each feeding, remains moist yet allows the maximum amount of air to be in contact with the roots. Given a location exposed to the proper sunlight, humidity, most any plant will achieve excellent health. Sunlight can be substituted by the use of growing lights and combinations of fluorescent and incandescent bulbs. Care must be taken with artificial light to prevent overheating. Adequate humidity levels must be maintained, too.

Since hydroponic gardens do not require soil, the growing area will naturally remain much cleaner. Gravel, if spilled, leaves no messy mud stains on the floor or patio. The gardener need not worry about soil-borne plants diseases nor weeds. The use of pesticides can be eliminated where indoor growing is practical and outdoor growing can incorporate greenhouse enclosures or natural insect bait plants.

Hydroponics allows the grower more time to concentrate on the plants. Plant thinning must be carefully watched, since plants grow faster and will push upon each other, retarding growth. Nutrient solutions must be monitored and not allowed to become insufficient. Most systems provide for water and nutrient changes each week or every two weeks, with simple addition of elements and water. (For the very technically oriented, solution analysis and experimentation can become a wonderful hobby.) As a plant is fed varying proportions of essential elements (nitrogen, potassium and phosphorous) the visible change can be very dramatic and sometimes beautiful. (Hydrangea flowers will change from pink to blue if the pH level is increased, a well-known evidence of a plant's sensitive physiologic[illegible] makeup.)

Hydroponics is fun. For the elderly, hydroponics offers a solution to the toil of growing. For the urban apartment dweller, hydroponics offers a means of growing where a garden could otherwise never be located. The traveler can program his hydroponic garden for automatic feeding during his absence.

Hydroponics is being employed around the world as a method of growing a wide variety of vegetables and flowers commercially. In the United States, tomatoes and cucumbers prevail; in Israel, varieties of beets, lettuce, spinach, onions and tomatoes are grown in large quantity. South Africa has done extensive commerical growing and produces asparagus and potatoes along with vegetables mentioned above.

Extensive research has and is being done in the use of hydroponics for desert regions and island countries where soil quality is poor and land availability is restricted. Even such esoteric uses as submarine growing and space flight gardens are not being left out as means of producing fresh produce under extreme conditions.

Future generations may see the use of hydroponics in large proportions, since populations increases are squeezing farm land more and more. The full flavor and meaty texture of hydroponic tomatoes bring a premium price today. As land becomes more and more expensive and less and less productive, hydroponics may prove to be the more efficient method for production of "garden fresh vegetables."

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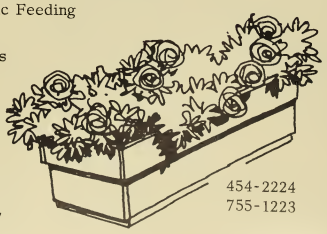

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BLACK light and floral arrangements

MARTHA H. ROSENBERG and MARCELEINE B. FORD

WHEN YOU THINK of night time activity, or things that have a nocturnal quality, flower arranging does not immediately leap to mind, does it? Well, let us tell you about a night time experiment in which we engaged, combining flower arrangements and "Black Light."

The Southwestern Group Judges Council, of National Garden Club, Inc. needed to plan a program to be attended by National Council Flower Show Judges from all the Judges' Councils in the State of California. After discussing several suggestions, a program featuring flower arrangements with candles was settled upon. Then a couple of months prior to the program, we asked ourselves, "Why not use Black Light with our arrangements?" Some of us had seen a brief exhibit at an Advanced Symposium. We described it as best we could, and everyone was enthusiastic. But while enthusiasm ran high, "Know-how" was sadly lacking. It was sort of like the hostess who always tries out her new recipes when she is having guests for dinner.

Well, we did know that we had to begin with a Black Light Lamp, but even buying one wasn't as simple as thought to be. The lamps came in a variety of models and sizes. They vary in size from 6 inches to 6 feet (fluorescent tubes), in intensity from 4 to 24 watts, and the lamps come with or without filters. Some are portable, some stationary. One was finally bought, about 18 inches long that looked something like a fluorescent bed lamp. It was thought we could hand hold the lamp and carry it from arrangement to arrangement. We eventually put the lamp on a tea cart and wheeled it around from arrangement to arrangement.

We learned that "Black Light" is the popular name for certain ultra-violet ray lamps; that some materials have the ability to absorb this energy; and when a Black Light is turned on the material in a dark room, fluorescence occurs. For instance, one day while playing with the lamp in a darkened room, we turned it on one of the ladies wearing a dress made of one of the new synthetic materials. The dress had a woven all over design, both design and background the same color. When the Black Light was turned on, the dress changed color and the design 'glowed' in still another color. Now we were beginning to see the possibilities.

So far, we have not found any plant materials that have the ability to absorb the ultra-violet rays in this manner. So we had to resort to a man-made method. By using fluorescent colors we could paint plant material, and when the lamp was turned on, the painted parts glowed in bright colors and the remaining material was invisible. It was exciting!

We discovered that fluorescent colors are available in chalks and paints. We decided paints were best for our purpose - chalks are better on paper. The flucrescent paints can be purchased in yellow, orange, red, blue, and green and these may be mixed with ordinary paints to get the tint or shade desired. Mixing the fluorescent colors does not give the usual results. For instance, mixing fluorescent blue with fluorescent yellow results in a grayish-white instead of green. So it is easier to use one fluorescent and one ordinary paint color, always bearing in mind that the fluorescent power is reduced in proportion to the amount of ordinary paint used. There is also a fluorescent paint called "invisible." In ordinary light, to the naked eye, it is a neutral beige color and is invisible on a neutral colored background or object. It does come in the major fluorescent colors that are only brought out under the 'Black Light'.

If all of this sounds complicated don't let it bother you. Just play around until you get the result you want. That is half the fun anyway. Another point to consider: Experiment and try to find plant material that doesn't mind being painted. And one word of warning: You are working with ultra-violet rays; be reasonably careful of your eyes - the same precautions you observe while under direct sunlight or sun bathing.

Well, 10 of us turned out 10 arrangements for the night of the program with varying degrees of success. They were complete with all sorts of plant material, flowers, and candles - some parts painted, some not. We weren't sure of the results. When the lights were turned off in the room and the 'Black Light' lamp was moved from one arrangement to another, the "Ohs" and "Ahs" and the ripple of comments that spread around the room was the frosting on the cake.

Martha Rosenberg and Marceleine Ford are members of the Southwestern Judges Council of National Garden Clubs, Inc.

Ferns San Diego

TWENTY-SIX KINDS OF FERNS are native to San Diego County. Native means that no one has planted or cultivated them where they are growing; they grow by themselves.

No small part of the delight of discovering ferns in the wild comes from their very unexpectedness. This is true especially of San Diego County; the majority of ours are not found in what we commonly think of as proper homes for ferns. Of course, ferns would be growing at the edge of a spring or on the slope of a shaded, damp ravine, but--ferns in the sand at the base of a room-sized boulder? Ferns on a sunny western slope along with the buckwheat and the cactus? Ferns in a rocky desert canyon?

So-called fern paradises occur in places having both heat and moisture. Take away one or the other, and the ferns native to a given area will show modifications of some kind. San Diego, which is warm to hot, but very dry, has a great variety of ferns, but few individuals of each kind. The redwood belt, which has ample moisture from rain and fog, but is cool or even cold, has only a few kinds but those few grow in great profusion and they grow tall. The two kinds which occur in both places may grow to eight feet under the redwoods, but only half that height here. No paradise this, from the ferns' point of view.

Plants are modified in both form and habit by conditions under which they exist. Here in San Diego these influences are: Long hours of bright sunlight, heat, dry air, low rainfall, and, on the desert side of the mountains, drying wind and blowing sand. Over the ages our ferns have evolved various forms of protection against these conditions: Sticky or waxy coatings, woolly or cottony tomentum, leathery texture, small size. I have wondered about the sticky ones on the desert that cover themselves with debris. Is this an additional advantage to the plant? A do-it-yourself shelter against the elements? Or against being eaten in a land where green is scarce?

Quick response to rainfall and short season of active growth are adaptations to our climate. One way or another most of our ferns are summer-dormant. The leaves may curl up and appear dead, or the whole plant may die back to the ground and simply not be there for many months. The seasonal span of tiny Adder's Tongue may be only four or five weeks, and in an unfavorable season it may not show at all. Polypody, common and widespread as it is, shows green leaves for only about six months.

Our specialized ferns will grow and prosper only in certain places. A few of them are classified as rare plants. One Colorado Desert fern is known from only one collection, which makes it as rare as anything can be! Finding ferns does not mean collecting ferns--that is, prying them out and bringing them home. With most of our native ferns this would be pointless and wasteful. Chances are they would not "stay with us" anyway, and under most circumstances even the taking would be against the law. Their habitats are impossible to duplicate. Most of our ferns fall into the indefinite classification of Rock Ferns, and how can you duplicate a fifty-foot cliff with a mountain to back it up? You might be able to transport a boulder weighing several tons, for a "base of boulder" fern, but there is more to it than that. There are the questions of how many years it took the fern to spread its root back under the boulder, how much rainfall dripped down the side of the rock, how much water is made available to the roots by unseen drainage from some higher ground, how much heat is needed by the plant, and so on. Let's continue to let them grow in their crannies and crevices, and be astonished and delighted when we find them.

When we think of the usual reasons for planting ferns in our gardens or using them as decorative pot plants, the native ferns, with a few exceptions, are immediately disqualified. Our two-to-six month kinds would hardly do if we plant ferns for their lush evergreenness. Even in their season quite a few of ours are neither lush nor very green. However, a few evergreen kinds do lend themselves to cultivation. These are the ferns that flourish luxuriantly in wetter climates than ours--

Not all ferns look like ferns! This is Marsilea mucronata and is popularly called "Clover Fern."

Helen Witham is Associate Curator of Botany at the Natural History Museum and a consultant on vegetation of San Diego County in the County School's Curriculum Department.

# of County

HELEN V. WITHAM

Photos by Dr. William A. Burns

Sword Fern, Wood Fern, Chain Fern, and Maidenhair. These are all long-lived, handsome, and easily cared for. If you wish to grow them, buy well-established plants from the nursery, set them in a cool shady place, and water them frequently; then you will have lush green ferns to enjoy forever after--they will grow on and on.

One non-evergreen fern is also suitable for cultivation, within limits. This is bracken. It is easily acquired because once it is established anyone who has it has too much of it, and he will be more than happy to share it with you. Bracken is a wild-growing fern of the wide mountain spaces, of forest floors and open hillsides--a fine garden fern if you have that much garden!

The laws protecting our native plants of course include ferns. Briefly, the regulations are: No collecting whatever, either of whole plants, branches, flowers, fruits, or cones, is permitted in National, State, or County Parks; from sanctuaries such as Silver Wood; from highway rights-of-way; or from private property without permission. If you have a valid reason for requesting it--for scientific or educational purposes--you may get a Botanical Collector's Permit from Forest Service District Rangers' Offices, in Descanso or Escondido. Even this Permit has restrictions, all of which make sense, so be sure to read and heed the fine print if you have reason to get such a permit.

Cleveland Lip Fern. This is a fern of dry, rocky ridges in the chaparral belt. Its brown-scaley rhizome is long-creeping, most often following a crevice or the base of a rocky outcrop. Leaves 6 to 16 in.

Interestingly enough, the first law enacted anywhere in the United States for the protection of a wild plant was for the sake of a fern. This was the Hartford Fern, *Lygodium palmatum*. During the 1860's, when someone found that after pressing with a warm iron, leaves of this none-too-plentiful fern would remain green and fresh-looking in the house throughout a long Connecticut winter, their use for decoration became a veritable rage. The ensuing threat of extinction led to passage of protective legislation, in 1867.

The most exciting way to have ferns in your garden is to grow your own, from spores. It is permissible to gather spores, to shake some into an envelope or take a small portion of mature leaf, which will provide thousands. But do be sure to safeguard your small bit of fern carefully: The spores are incredibly small & light.

This article is reprinted by permission of the San Diego Society of Natural History and is part of a forthcoming book, "Ferns of San Diego County" sponsored by the John Porter Dexter Memorial Fund of the Natural History Museum. The book is scheduled for publication in 1972.

Author with small "lacy" Boston Fern. Note hanging "Fishtail" Boston Fern.

Decorate with Ferns

DOROTHY MARX

Photos by Betty Mackintosh

PROBABLY NO SINGLE ACCESSORY can do more to give your home a lift than a lush green fern. Although ferns are flowerless, they are the epitome of freshness, a beautiful accent for any room.

As a single plant, perhaps only one of the Boston ferns, *Nephrolepis exaltata bostoniensis*, will continue happy indoors. Most ferns will need more humidity than they will receive indoors, but these ask only that their roots be kept evenly moist in well-drained soil in which there is plenty of humus. Boston ferns vary from the somewhat coarse-textured common fern found even in grocery stores to the "lace" ferns with such finely-cut fronds they seem like green froth. These are available in most nurseries, but for a fern-lover's treat visit Talnadge Fern Gardens at 354 "G" Street in Chula Vista where the selection of choice and rare ferns is truly outstanding. Good varieties to ask for are N. 'Fluffy Ruffles', *N. smithii*, and *N. childsii*, but there are many others.

For the dedicated gardener who is willing to give the proverbial tender, loving care, the sky is the limit as to what will grow indoors. This gardener grew dozens of ferns with other plants indoors for many years. Only the maidenhairs *(Adiantums)* refused to thrive in my New York sunporch and, to be honest, they don't do too well on the patio here either. I grew *Asplenium*s well-both the bird's nest *A. nidus* and the mother fern *A. bulbiferum* as well as the beautiful blue-green *Polypodium aurea* and the unusual gold-backed *Pityprogramma*. My conversation piece was (and still is) my climbing fern *Lygodium japonicum* which, for its variety, is surprisingly easy to grow.

Climbing fern, Lygodium japonicum.

Even the epiphytic ferns, the rabbit's foot *Davallia* and the staghorn *Platycerium* did quite well indoors. I brought three staghorns to California with me and must admit they have been happier on my sheltered patio. They relish the moisture from the ocean.

The secret of growing these ferns indoors was, of course, that I grew MANY plants together. There is always more humidity in the air around plants grouped together than around a single plant. They help each other and, incidentally, create a more healthful climate for people, also. Humidity can also be supplied indoors by growing plants, singly or in groups, over trays of water in which pebbles are placed to hold the pot above the water.

Do consider a hanging fern indoors. A plastic pot is easy to keep clean and will allow for less frequent watering - perhaps twice weekly - when the fern can be carried outside for soaking or even watering from above if you have a handy hook from which it can hang while draining. The dramatic effect of a hanging fern will more than repay you for this additional care.

If the challenge of growing ferns indoors is too great, you will find them easy to grow in a sandy area

Dorothy Marx is a National Garden Clubs Judge with Masters Certificate. She is the Chairman of the South Western Judges Council.

outdoors with minimum care. Try the Japanese holly fern *Cyrtomium falcatum*, which is very dark green and too large to grow indoors. I have a crested variety of this which is lovely on a pedestal with lesser plants grouped around it. A fine basket fern with dark, leathery, unfern-like fronds is *Pyrrosia lingua*. One of my special loves is my moosehead *Platycerium grande*,

which grows happily well-secured to the house wall where it gets no direct sun, heavy rain, or wind but can enjoy our moist air and mild climate.

If you have only sunny areas and want the effect of ferns try an asparagus. *A. sprengeri* is happy with full sun or shade and can take heavy wind without damage. It can grow as a groundcover or in a pot or basket. *A. meyerii* with its handsome round "fronds" likes the same surroundings as ferns but can withstand wind better.

Cultural hints for ferns must include a reminder that ferns are shade-lovers and want little if any direct sunlight but need good light. They need wind and draft protection. If drainage is adequate, it is hardly possible to overwater a fern, but never let water stand in a saucer under a fern more than an hour or so after watering. Feed ferns sparingly and only after watering and when plants are well established. Overfeeding does more harm than good.

It is fortunate that fern pests are few because ferns are extremely sensitive to insecticides. Prevention is the best method so keep plants, pots, and surroundings clean and inspect often to detect insects before a bad infestation occurs. Scale is the fern's worst enemy. Cut back and destroy fronds which are heavily infested, but if there are only a few scales, they can be removed with a toothpick. Isolate affected plants. Fern spores are sometimes mistaken for scale but spores are always arranged in neat order on the undersides or along the edges of the fronds. Scale frequently appears on the stipes (stems).

Because of the tremendous variation in ferns, they are a fascinating collector's subject. There are 175 genera and thousands of varieties from which to choose. There is always one which you did not even know existed, waiting to be found, just inside the next nursery you visit. Happy hunting and good growing!

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BONSAI SOCIETY

Masao Takanashi

Now is the time

to dig native California juniper. (CAUTION: Get permission from owner of land.) Try area east of Jacumba where Highway 80 will go and beat the bulldozers.

to look for junipers with good foliage which indicates a good root system.

to loosen soil around juniper inch-by-inch (a rock pick is a good tool) in order to get the entire root system INTACT.) Ball in burlap and secure with twine.

to start transplanting and repotting in February, depending upon the weather.

CACTUS & SUCCULENT SOCIETY

Dr. LeRoy Phelps

Now is the time

to protect cacti and other tender succulents from frost.

to remember that among the oddities of these unique plants, they cope better with cold weather in a DRY state.

to inspect for scale and other insects. For a small collection, wipe scale away with a cotton swab dipped in alcohol and water, or spray with that mixture. For a larger collection or plants with many spines, spray with pyrethrum (from the daisy of the same name) or malathion or a general dormant oil spray.

to consider redesigning the garden and to plan for easier maintenance.

CAMELLIA SOCIETY

Bob McNeil

Now is the time

to change to 0-10-10 if you are still feeding.

to try "gibbing" by the use of the growth hormone, gibberellic acid. Break off growth bud closest to the flower bud. Apply one drop of gibberellic acid immediately to the socket from which the growth bud was taken.

to disbud and groom both plants and flowers for shows --February is really the month of the Camellias.

DAHLIA SOCIETY

Mildred Middleton

Now is the time

to inspect tubers in storage for signs of rot or shrivelling. Cut away any rot. If too dry, add a little moisture.

to prepare soil in February, digging in 2 1/2 pounds of super-phosphate and a like amount of sulphate of potash fertilizer for each 100 square feet.

EPIPHYLLUM SOCIETY

Dr. J. Walter Troxell

Now is the time

to guard them from frost while still dormant in January.

to fertilize with a low-nitrogen, high - phosphorus preparation (0-10-10 or 0-10-08), using one teaspoon to a quart of water when they start pushing the buds.

to resume regular watering schedule.

to avoid disturbing and moving them about after buds are well set.

FUCHSIA SOCIETY

Annabelle & "Bud" Stubbs

Now is the time

to start pruning in frost-free areas. Basket fuchsias are cut back to edge of basket and down to within 4" of soil level. Fuchsias grown in the garden are cut back from 1/3 to 1/4, shaping as you prune, and opening center.

to protect against frosts. DRY plants freeze faster and more easily.

to use "finger test" to eheck for proper amount of moisture in soil.

to consider the use of a slow-release fertilizer (21-8-8) for year-around use. Sprinkle one tablespoon to a basket on top of soil; when color from blue granules is no longer visible--perhaps 3 or 4 months later! --it's time to add more.

ORCHID SOCIETY

Ione Maloney

Now is the time

to enjoy--to continue to sit back and admire your orchids. (Meanwhile, continue routine care.)

ORGANIC GARDENING SOCIETY

P. F. "Kay" Canady

Now is the time

to deep water and fertilize your fruit trees. Care NOW will pay off in increased yield next summer.

to use a dormant

Nibby Klinefelter is a compulsive gardener who loves plants but finds time to contact all of our affiliates for this Calendar of Care.

spray now, and again when the buds begin to show.

to add spent annuals, leaves and other HEALTHY material to the compost.

to close mow your Bermuda lawn (if you haven't) and to sow annual rye grass seed for a green lawn until the Bermuda comes back. Be sure seed makes contact with soil; cover with seasoned steer manure (weed-free, of course) and water well for quick results.

to plant a good cover crop on any bare ground--there's nothing better for your soil than "green manure"!

ROSE SOCIETY

Bernice Lockman

Now is the time

to prune.

to watch for dates for pruning demonstration during January in Balboa Park rose garden.

to spray before and after pruning as an aid for going dormant.

Now is the time

TO PATRONIZE

OUR ADVERTISERS

AND SAY "THANK YOU!"

THE BOOK SHELF

LAWN AND GROUND COVERS by James Underwood Crockett and Time Life Book Editors. N. Y., 1971. 160 pages.

This is one of the series of volumes comprising the Time Life Encylopedia of Gardening. The illustrations are particularly lovely and include both photographs and watercolor paintings in the encyclopedia sections. Nearly all of these illustrations are in color. The artist-illustrator is Allianora Rosse, a specialist in flower painting. It is a joy to browse through her illustrations of ground covers. There you will find everything from *Achillea tometosa* to *Xanthorhiz simplicissima* in addition to all the various grasses you might use in your lawn. The encyclopedia section gives plant characteristics and cultural advice and also offers suggestions for using the plant.

What to do about weeds is so beautifully illustrated that it leaves me wondering if we should do anything about them other than admire them.

Taking care of your lawn is approached with much detail and many diagrams. Problems and pests are dealt with thoroughly. Repairing old lawns or beginning new ones is an important section of the book.

A section of superb photographs of various ground covers used alone or in conjunction with one another cannot fail to be inspiring.

There is a bibliography, an index, and a chart giving a quick look at characteristics of 88 ground covers. Maps showing climatic zones for ascertaining hardiness are at the end of the encyclopedia of ground covers.

This book makes me want to rush out and do something about my front lawn, and I know you will feel the same way.
Reviewed by Doris Blick.

ANNUALS by James Underwood Crockett and the Editors of Time-Life Books. N. Y. 1971. 176 pages.

How to plan your garden of annuals for summer long color and the soils and care needed for maximum blooms is the subject of the first section of this beautifully illustrated book on annuals. Many lovely photographs show the use of annuals in various situations. How to grow annuals is thoroughly detailed from planting the seeds to multiplying the blossoms and controlling pests or diseases. Various ways of staking plants are illustrated with diagrams.

There is a section on annuals for cutting illustrated by photographs of bouquets for every room. The encylopedia section is lovingly illustrated with watercolor paintings by the artist, Allianora Rosse.

Maps give climate zones and spring planting times, and there is a chart giving characteristics of 249 annuals and plants treated as annuals. The book is indexed.
Reviewed by Doris Blick.

Doris Blick is a City Librarian who loves plants. She is the Floral librarian and a Director.

CREATING WITH CATTAILS, CONES, AND PODS by Dot Aldrich. Hearthside Press Inc., N.Y. c1971. $6.95. 244 pages.

Do you want to know how to create the most improbable items from "cat-tail timber"? Mrs. Aldrich illustrates with drawings and photographs how to make everything from bun baskets to fully furnished doll houses with dried cat-tail stems.

Want to create a miniature zoo? You'll find instructions for constructing crafty critters such as teasel bears and bunnies, a teasel lion, and a teasel-martynia goat. From pine cones, you might make owls, pixies, quail, mice, fish, and even a reluctant dragon. Peanuts and pipe cleaners are used to construct all kinds of animals and birds.

The last section of the book is about constructing flowers from various natural materials. Even onion skins and grapefruit peels are utilized. Photographs illustrate the use of these artificial flowers in the chapter on dried arrangements. There are detailed instructions of step-by-step procedures to be used in constructing the arrangements. Corsages, hats, and jewelry projects are illustrated and discussed in the last chapter.

There is an index to the book. One of the most helpful features is the listing of materials needed at the beginning of each project. Photographs and illustrations are plentiful and very well done.
Reviewed by Doris Blick

TOPIARY AND ORNAMENTAL HEDGES by Miles Hadfield, St. Martins Press, N.Y. c1971. $12.50. 100 pages.

The origins and uses of hedges and topiary in gardens and its development particularly in England is traced in the first half of this book. There is much discussion of the type of plants used for these hedges from earliest times to the present. Quotations are made from many ancient garden books about plants and their manner of use in formal gardens.

Appendix I composes nearly all of the second half of the book and is a plant list of suitable hedge and topiary materials for present day gardeners. Each plant is described as to growing habits, soil, and cultivation preference, and pruning requirements.

Both sections of this book are illustrated by black and white photographs. Appendix II is a bibliography of pertinent English garden books. There is an index.

This book is particularly good for the person interested in the historical aspects of garden development.
Reviewed by Doris Blick

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Pollution Problems-1:

NAVY POLLUTION PROBLEM IN SAN DIEGO: A SITUATION REPORT

CDR JAMES H. ARD, U.S.N. Ret.

OUR NAVY has been a major contributor to San Diego in many ways over many years. The harbor, location, and climate are ideal for many important Navy activities. The operating base (U.S. Naval Station, San Diego, at the Foot of 32nd Street) is a natural development for support of surface ships using the harbor. Submarines are effectively based at Pt. Loma. The Naval Air Station, North Island, is a major point for control of the Naval air arm and the repair of aircraft. Naval and Marine training centers are a complement to the rest.

With the forces and the men come changes: Building and runways, fences and roads, piers and boathouses. All created wastes and a need to dispose of them. Over it all, on many days hung a pall of smoke from ships, from industrial activities, from aircraft, from firefighter training, and from disposal of paper trash.

For a long period, the time-honored disposal methods were acceptable, including open burning, dumping in the bay or at sea or in open pits, or burying. However, in recent years with the growth of the communities surrounding the Bay, it became necessary for San Diego to adopt strong measures to reverse the processes of pollution, to clean up and stop adding to the detritus of living and working. The highly successful results in the Bay have received national acclaim.

The Navy has joined in the process. With a heavy involvement and a long standing commitment as members of the San Diego community, major commands in the area have established continuing programs for pollution reduction. The Commander, First Fleet, to whom falls much responsibility for ships in the area, and the Commandant, Eleventh Naval District, whose responsibility extends to most Naval shore activity in the area, are deeply involved. One by one the smoke clouds disperse, the liquid wastes are purified.

Dramatic actions have been reported. They range from the initiative of water front workers (who designed and built a floating trash sweeper for collecting material from the surface of the water) to budgetary authorization of millions of dollars for redesigning firefighting schools. Liquid waste treatment plants are being built in ships and industrial complexes.

Of first importance has been the establishment of Federal standards applicable to Naval installations and the formation of working groups. These ad hoc committees assure liaison with appropriate municipalities while assuring continuing consideration of the problems.

More is to come. Clean burning fuels are replacing residual fuels. Sound proof engine test buildings are being built. Spill-proof oil transfer systems are being designed.

The Navy is convinced that most of the pollution under its control will be controlled. The best assurance of this will continue to be the affected communities joined in watchful cooperation.

James Ard, since retiring from the Navy, has been active in local organizations interested in our environment.

Editors note:

Since 1909, when the first issue of CALIFORNIA GARDEN was printed, the emphasis has been on the creation of a beautiful and healthy San Diego. Plants do purify the air, but when air pollution becomes too heavy, plants die. It is impossible to plant enough. We see the signs of air pollution damage on our plants. We hope to be able to bring you reports in future issues on what is being done to stop some of the major causes of air pollution.

Newspapers in the Garden

JOHN E. MILLER

NEWSPAPERS ARE FANTASTIC in the garden. They can be used as a mulch, as a fertilizer, and as food for earthworms. (Corregated cardboard makes perfect caves for earthworm homes, too.

My formula for using newspapers is as follows: 1. Tear or shred newspapers. They may be torn in long, narrow strips by hand or shredded by a rotary lawn mower or shredder. (Better not do it on a windy day.) 2. Place newspapers in a large 20 gallon waste basket or 55 gallon metal drum which is one-eighth to one-fourth full of cow or rabbit fertilizer. 3. Fill with water, mix throughly, and cover for about two days. 4. Apply to garden by mixing one three pound coffee can of the concentrate to five gallons of fresh water.

Newspapers can be crumpled by hand, placed in a hole, drenched with boiling water, and covered with soil. They can be used in planting holes for shrubs and trees in this manner. Cardboard can be used in the same way, too. They help to retain moisture in the soil.

Newspapers are very good insulators and can be used to cover the ground for a protective winter mulch. It will help to keep the weeds from growing, too.

Many people put layers of newspapers in their compost heaps.

Newspapers are bio-degradable and are used by organic gardeners. So, if you don't recycle your newspapers, plant them.

John Miller is an organic gardener who is constantly experimenting with new ideas and new methods of gardening without chemicals.

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SAN DIEGO FLORAL ASSOCIATION

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The Park and Recreation Dept., City of San Diego)

Third Tuesday, Casa del Prado
Pres.: Mrs. Louis Kulot 222-5480
2732 Azalea Drive., San Diego 92106

FLOWER ARRANGERS' GUILD OF SAN DIEGO
First Thursday, Casa del Prado, 9 a.m.
Pres.: Mrs. J. Wells Hershey 443-2329
12505 Royal Rd., #52, El Cajon 92021
Rep.: Mrs. J. Otto Crocker 582-5316
4749 Redlands Dr., San Diego 92115

MEMBER CLUBS

CONVAIR GARDEN CLUB
First Wednesday, Casa del Prado, 7:30 p.m.
Pres.: Rev. Arnold W. Carroll 276-2051
1911 Erie St., San Diego 92110

COUNTY CIVIC GARDEN CLUB
Meets every Thursday, 12 to 1 p.m.
Garden House, Grape and 101 Civic Center
Director: Mr. James Saracino 239-9511
1600 Pacific Highway, San Diego 92101

IKEBANA INTERNATIONAL CHAPTER No. 119
Fourth Wednesday, Casa del Prado, 10:30 a.m.
Pres.: Mrs. James Ard 276-6398
3031 Karnes Way, San Diego 92117

LA JOLLA GARDEN CLUB
First Tuesday, 1:00 p.m., St. James Hall
7776 Eads Ave., La Jolla
Pres.: Mrs. Harley Cope 459-7688
6608 Avenida Bizarro, La Jolla 92037

LAS JARDINERAS
Third Monday, 10 a.m. Homes of members
Pres.: Mrs. Fred Hage 222-0033
3510 Elliott St., San Diego 92106

MEN'S GARDEN CLUB OF SAN DIEGO CO.
Fourth Thursday, Casa del Prado, 7:30 p.m.
Pres.: Mr. Wm. Spann 278-2410
4101 Mt. Bigelow Way, San Diego 92111
Rep.: Dr. J. W. Troxell 282-9131
4950 Canterbury Drive., San Diego 92116

ORGANIC GARDENING CLUB
Third Friday, Casa del Prado, 7:30 p.m.
Pres.: Paul Canaday Sr. 264-6702
303 No. 47th St. CD-4 San Diego 92102

POINT LOMA GARDEN CLUB
Second Wednesday, S.D. Federal, Rosecrans & Canon, 10 a.m.
Pres.: Mrs. F. G. Wood 224-3051
750 Albion St., San Diego 92107

SAN DIEGO BONSAI SOCIETY, INC.
Second Sunday, Casa del Prado, 1-5 p.m.
Pres.: Lester Jaussaud 479-1639
201 Lake View Ave., Spring Valley, Calif. 92077
Rep.: Viola Schutte 422-4805
Box 835, Chula Vista 92012

SAN DIEGO BOTANICAL GARDEN FOUNDATION, Inc.
Second Thursday, Casa del Prado
P.O. Box 12162, San Diego, Calif. 92112
Pres.: Samuel W. Hamill 296-2605
4467 Ampudia St., San Diego 92103

SAN DIEGO CACTUS & SUCCULENT SOCIETY
First Saturday, Casa del Prado, 1:30 p.m.
Pres.: Ione Hubner 444-3439
231 W. Park Ave., El Cajon 92020
Rep.: Mrs. Peter Klinefelter 276-6517
2201 Fairfield St., San Diego 92110

SAN DIEGO CAMELLIA SOCIETY
Second Friday, Casa del Prado, 7:30 p.m.
Pres.: Mrs. Althea Hebert 466-3389
8845 Country Club Place, Spring Valley 92077
Rep.: Mrs. Mildred Murray 753-7756
467 E. Fulvia St., Encinitas 92024

SAN DIEGO COUNTY DAHLIA SOCIETY
Fourth Tuesday, Casa del Prado, 7:30 p.m.
Pres.: John C. Wright 583-2548
4905 Twain Street, San Diego 92120
Rep.: Mrs. R. M. Middleton 296-3246
3944 Centre St., San Diego 92103

SAN DIEGO EPIPHYLLUM SOCIETY
Third Wednesday, Casa del Prado, 7:30 p.m.
Pres.: Wm. H. Nelson 298-3349
4253 Maryland Street, San Diego 92103

SD-IMPERIAL COUNTIES IRIS SOCIETY
Meets 3rd Sunday, Casa del Prado, 2:30 p.m.
Pres.: Mr. Edward Pasahow 453-4145
6235 Syracuse, San Diego 92122

SAN DIEGO COUNTY ORCHID SOCIETY
First Tuesday, Casa del Prado, 8 p.m.
Pres.: Mr. Henry Marosz 584-0334
6122 Rockhurst Dr., San Diego 92120
Rep.: Mrs. Ione Maloney 479-7742
3058 Bonita Mesa Rd., Bonita, Calif. 92002

SAN DIEGO FUCHSIA SOCIETY
Second Monday, Casa del Prado, 8 p.m.
Pres.: Mrs. Frankie Ivy 283-2767
3984 32nd St., San Diego 92104
Rep.: Mrs. Walter Bunker 281-5027
4721 Bancroft St., San Diego 92116

SAN DIEGO ROSE SOCIETY
Third Monday, Casa del Prado, 8 p.m.
Pres.: Mrs. Otto Barksdale 222-2884
3756 Milan St., San Diego 92107
Rep.: Mrs. Felix White 264-4440
5282 Imperial Ave., San Diego 92114

S. D. TROPICAL FISH SOCIETY
Second Sunday, Casa del Prado, 7:30 p.m.
Pres.: Mr. William Smith 272-8723
3586 Hatteras, San Diego 92117

SOUTHWESTERN GROUP, JUDGES' COUNCIL CALIFORNIA GARDEN CLUBS, INC.
First Wednesday, Casa del Prado, 10:30 a.m.
Pres.: Mrs. John Marx 459-6417
1216 La Jolla Rancho Rd., La Jolla 92037
Rep.: Mrs. Roland S. Hoyt 296-2757
2271 Ft. Stockton Dr., San Diego 92103

OTHER GARDEN CLUBS

PALOMAR DISTRICT, CALIFORNIA GARDEN CLUBS, INC.
Director: Mrs. Benjamine Tate 420-1700
99 Second Ave., Chula Vista 92010

ALFRED D. ROBINSON BEGONIA SOCIETY
Third Friday, Homes of Members, 10 a.m.
Pres.: Miss Myrle Patterson 224-1572
4310 Piedmont Dr., S.D. 92107

BERNARDO BEAUTIFUL & GARDEN CLUB
First Wednesday, 1:00 Seven Oaks Community Center, Bernardo Oaks Dr., Rancho Bernardo
Pres.: Mr. Irvin C. Baechtold 487-2103
12175 Pastoral Rd., San Diego 92128

CARLSBAD GARDEN CLUB
First Friday, Conference Room, Public Library 1:30 p.m.
Pres.: Mrs. Floyd Anderson 729-7610
3595 Catalina Drive, Carlsbad 92008

CHULA VISTA GARDEN CLUB
Third Wednesday, Chula Vista Woman's Club 357 "G" St., 1:00 p.m.
Pres.: Mrs. Harold Howell 479-5188
Box 644, Bonita 92002

CITY BEAUTIFUL OF SAN DIEGO
Pres.: Mrs. Raymond E. Smith 488-0830
4995 Fanuel St., Pacific Beach 92109

CORONADO FLORAL ASSOCIATION
Meets 1st Tuesday, Red Cross Bldg., 1113 Adella Lane
Pres.: Capt. George L. Heap 435-3929
620 First St., Coronado 92118

CROSS-TOWN GARDEN CLUB
Third Tuesday, Knights of Columbus Hall, 3827 43rd St., S.D. 92105, 8 p.m.
Pres.: Mrs. Charles Williams 284-2317
3865 41st Street, San Diego 92105

CROWN GARDEN CLUB OF CORONADO
Fourth Thursday, Red Cross Bldg., 1113 Adella Lane, 9:00 a.m.
Pres.: Mrs. John A. Copeland 435-5742
1121 Alameda Blvd., Coronado 92118

DOS VALLES GARDEN CLUB
Meets 2nd Tuseday, Alt. Pauma Valley and Valley Center 1:30 p.m.
Pres.: Mrs. E. L. Lamoureaux 745-0243
31643 Oak Glen Rd., Valley Center 92082

ESCONDIDO GARDEN CLUB
3rd Friday, Woman's Club, 240 So. Bdwy., 1:00 p.m.
Pres.: Mrs. A. Ray Jewell 746-4861
1013 E. Fifth Ave., Escondido 92025

FALLBROOK GARDEN CLUB
Last Thursday, Fallbrook Woman's Clubhouse, 1:30 p.m.
Pres.: Mrs. James DeShazo 728-7423
152 Emilia Lane, Fallbrook 92028

GREEN VALLE GARDEN CLUB, POWAY
Meets 4th Thursday, 9:30 a.m. Homes of members
Pres.: Mrs. Charles E. Chandler 487-2203
13627 Jackrabbit Rd., Poway 92064

GROSSMONT GARDEN CLUB
Second Monday, 10 a.m.
8155 University Ave., La Mesa
Pres.: Mrs. Albert W. Lawrence 466-4616
4350 Yale Ave., La Mesa 92041

HIPS and THORNS
Meets at Members' Homes Quarterly
Pres.: Mrs. Eugene Cooper 295-7938

IMPERIAL BEACH GARDEN CLUB
3rd Tuesday, Imperial Beach Civic Center 1:30 p.m.
Pres.: Mrs. Roman Rolphes 424-7487
1228 Seventh St., Imperial Beach 92032

LA JOLLA NEWCOMERS (Garden Section)
Third Wednesday, 10:00 a.m., Selected Gardens
Chairman: Mrs. Don Sanson 454-4616
1466 Torrey Pines Rd., La Jolla 92037

LAKESIDE GARDEN CLUB
3rd Monday, Lakeside Farm School, 7:30 p.m.
Pres.: Mrs. Lucy May Carender
9282 Riverview, Lakeside 92040

LA MESA GARDEN CLUB
3rd Thursday, La Mesa Women's Club, 1:00 p.m.
Pres.: Mrs. Val Sexton
9144 Johnson Ave., La Mesa 92041 466-0047

LEMON GROVE WOMAN'S CLUB
(Garden Section)
First Tuesday, Lemon Grove Woman's Club House, 1 p.m.
Pres.: Mrs. D. D. Lairsey 466-2840
8285 Palm Ave., Lemon Grove 92045

MISSION GARDEN CLUB
Meets First Tuesday, Church of Rel. Science
4102 Marlborough Ave., S.D. 92116, 8:00 p.m.
Mrs. Vera Eimar 477-5344
1129E 16th St., National City 92050

NATIONAL FUCHSIA SOC., ENCINITAS BRANCH
3rd Friday, 7:30 p.m., Home Federal Bldg., Encinitas
Pres.: E. Grove Teaney 726-3728
826 S. Santa Fe Ave., Sp. 23, Vista 92083

NORTH COUNTY ROSE SOCIETY
1st Tuesday, 7:30 p.m., John Landis Park (Cedar & Lewis) Oceanside
Pres.: Mr. Paul B. Marner 745-0797
525 W. El Norte Parkway, Sp. 31, Escondido 92025

NORTH COUNTY SHADE PLANT CLUB
Second Sat., 1:30 p.m., Home Federal Bldg., Encinitas
Pres.: Mrs. Helen Rose 756-2023
Paseo Delicios, P.O. Box 828, Rancho Santa Fe 92067

O. C. IT GROW GARDEN CLUB
Second Wednesday, S. Oceanside School Auditorium, 7:30 p.m.
Pres.: Mr. Michael J. Hardick 722-3583
1409 Division, Oceanside 92054

PACIFIC BEACH GARDEN CLUB
Meet second Monday, 7:30 p.m. Community Club House, Gresham and Diamond Sts., Pacific Beach
Pres.: Mrs. Arthur Berthelsen
1434 Grand Ave., San Diego 92109 274-6081

PALOMAR CACTUS & SUCCULENT SOCIETY
Third Saturday, 1 p.m., Palomar College Foreign Language Building, Room F22
Pres.: Mr. Harold Marino 748-2563
14157 Ezra Lane, Poway 92064

PALOMAR ORCHID SOCIETY
3rd Thurs., 7:30 p.m., Vista Rec. Center, 160 Rec. Dr., Vista
Pres.: Mr. Jess Schiffer 724-4743
872 Newport Dr., Vista 92083

POWAY VALLEY GARDEN CLUB
2nd Wednesday, 9:30 a.m. "Haley's," 13519 Poway Rd.
Pres.: Mrs. Philip Heine 748-4876
13010 Neddick St., Poway 92064

QUAIL GARDENS FOUNDATION, INC.
230 Quail Garden Drive, Encinitas, Calif. 92024
Mrs. M. J. von Preissig 286-8818
5071 55th St., San Diego, Calif. 92115

RANCHO SANTA FE GARDEN CLUB
Second Tuesday—Club House, 2:00 p.m.
Pres.: Mr. Wilfred S. Teetzel
Box 1314, Rancho Santa Fe 92067

SAN CARLOS GARDEN CLUB
Fourth Tuesday, San Carlos Club, 6955 Golfcrest Drive
Pres.: Mrs. Stephen J. Koonce 286-1979
6732 Golfcrest Dr., San Diego 92119

SAN DIEGO BROMELIAD SOCIETY
1st Thursday, 8 p.m. Porter Hall Clubhouse (8425 Univ.), La Mesa
Pres.: Mrs. Don Birchell 466-7631
6070 Sarita, La Mesa 92041

S.D. CHAPTER CALIF. ASS'N NURSERYMEN
Second and Fourth Thursday, 7:30 p.m.
Pres.: Mr. Mato Asakawa 297-4216
5115 Linda Vista Rd., San Diego 92110

S.D. CHAPTER NATIVE PLANT SOCIETY
Pres.: R. Mitchel Beauchamp 477-8669
1841 E. 16th St., Apt. B, National City 92050

SAN DIEGUITO GARDEN CLUB
Third Wednesday, Seacoast Savings Building, Encinitas, 10 a.m.
Pres.: Mrs. Dorothy Reavell
1222 Santa Fe Dr., Encinitas 92024 753-4908

SAN MARCOS GARDEN CLUB
Pres.: Mr. E. C. Pferdner
1221 San Julian Dr., San Marcos 92069 744-0226

SAN MIGUEL BRANCH, AMERICAN BEGONIA SOCIETY
Second Wednesday, Porter Hall Clubhouse, La Mesa (8425 University) 8:00 p.m.
Pres.: Mrs. Peter P. Lee 239-3169
1852 31st St., S.D. 92102

SANTA MARIA VALLEY GARDEN CLUB
Second Monday, Ramona Women's Club House, 5th and Main, 9:30 a.m.
Pres.: Mrs. Winifred Posik 789-0531
723 E St., Ramona 92065

SANTEE WOMEN'S CLUB Garden Sec.
Pres.: Mrs. John Ainsworth 488-3342
844 Fanita Dr., Santee 92071

VISTA GARDEN CLUB
First Friday, Vista Rec. Center 1:00 p.m.
Pres.: Mrs. L. G. Farrell 724-6019
735 Mesa Ave., Vista 92083

VISTA MESA GARDEN CLUB
Second Tuesday, 7:30 p.m. Family Association Center
Pres.: Mrs. D. R. Gardiner 277-3635
8003 Linda Vista Rd., San Diego 92111

CALIFORNIA GARDEN
San Diego Floral Association
Casa Del Prado, Balboa Park
San Diego, CA 92101

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